

it not for the effect of contrast; it is well known that a grey object lying on a vividly green ground appears to be of a reddish or purplish hue. It may here be remarked that this phenomenon yet awaits explanation; it was at one time thought that the eye insensibly travelled over the green expanse, the green colour sensation became fatigued, and faint white light afterwards provoked the complementary sensation. It has been found, however, that the same colour phenomena are observed when the illumination is instantaneous, so that this theory falls to the ground.

Finally, it may be stated that Sir Montagu Pollock's book is throughout of absorbing interest; the excellence of the illustrations can be inferred from an inspection of those used to illustrate this short notice, and the printing is everything that could be desired.

EDWIN EDSER.

NOTES.

WE understand that the second International Wireless Telegraph Conference, which was to have been held in Berlin on October 6, has been postponed until next spring. It will be remembered that the Wireless Telegraph Act which was passed at the end of last session was rushed through the House partly that the Government representatives might have a better basis for making agreements at this conference. It is stated that a considerable number of applications for licences under this Act have been received by the Postmaster-General. Some of these applications come from the submarine cable companies.

THE funeral of Prof. Niels Finsen at Copenhagen on September 29 was attended in person by King Christian, King George of Greece, Queen Alexandra, and all the other Royalties now in Copenhagen, as well as by the Danish Ministers of State, members of the Diplomatic Corps, the president of the Danish Parliament, the Burgomasters of Copenhagen and the chief provincial towns, and numerous representatives of foreign scientific institutions, universities, and societies. King Edward was represented by the British Minister, Sir W. E. Goschen. A number of Danish medical men have issued an appeal for the erection of a monument to Prof. Finsen by voluntary contributions.

A NEW association, the Institute of Hygiene, has been formed having for its object the dissemination of knowledge on the subject of personal and domestic hygiene. It aims to be self-supporting, and in order to accomplish this has organised a permanent exhibition of hygienic products and appliances, e.g. foods, clothing, filters, stoves, &c., open free to the general public, and a special section devoted to drugs and medical and surgical appliances to which medical men alone are admitted. The revenue gained from the rents paid by exhibitors will be devoted to educational work, which will take the form of local lectures, with examinations and certificates. The exhibition, which was formally opened by Sir Joseph Fayrer on September 30, is housed at 34 Devonshire Street, W.

A VISIT by a party of French physicians and surgeons is about to be paid to London. The party is to arrive on October 10, and will comprise some 150 gentlemen. A committee, of which Sir William Broadbent is president and Sir Thomas Barlow treasurer, has been organised to make arrangements for their reception and entertainment, Dr. Dawson Williams and Dr. Jobson Horne being the honorary secretaries. They will be entertained at a banquet at the Hotel Cecil on October 12.

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PROF. KOCH has retired from the post of director of the Institute for Infectious Diseases at Berlin owing to the increasing demands which other bacteriological work make upon his time and energies. The Berlin correspondent of the *Times* states that in the course of the winter Prof. Koch will proceed to German East Africa in order to continue those studies of tropical and other diseases which he had not completed during his recent visit to Rhodesia. In particular he will continue to investigate the part played by ticks in conveying the infection of various cattle diseases.

A CONFERENCE on agricultural education will be held in the Shire Hall, Gloucester, on Saturday, October 15, under the presidency of Sir John Dorington, M.P. At the morning session Lord Onslow will deliver an address, and the other speakers will include Sir W. Hart Dyke, Prof. T. H. Middleton, and Lord Monteaigle. At the afternoon session Sir T. Dyke-Acland, Sir John Cockburn, Mr. A. D. Hall, and others will address the conference.

THE deaths are announced of Prof. E. von Martens, vice-director of the Berlin Zoological Museum, and Dr. P. van der Vliet, formerly professor of physics at the University of St. Petersburg.

THE Physico-Mathematical Society of Kazan has awarded the Lobatchewsky prize to Prof. D. Hilbert, of Göttingen, for his book on "Die Grundlagen der Geometrie" and other researches. The Lobatchewsky gold medal has been conferred on Prof. Poincaré, and Profs. Mansion, Laisant, and Peano have been elected honorary members of the society.

THE twenty-fifth annual "Fungus Foray" of the Essex Field Club will be held on Saturday, October 15, at High Beach, Epping Forest. The referees will be Dr. M. C. Cooke and Mr. George Massee, of the Kew Herbarium. Mr. Massee will read a paper on some diseases of trees. Any botanists wishing to attend should communicate with the secretary, Buckhurst Hill, Essex.

PROF. FEHR, of Geneva, editor of *L'Enseignement mathématique*, is circulating among mathematicians an inquiry form containing a number of questions relating to their manner of working. These questions refer to such points as when and where the mathematician answering them acquired his taste for mathematics, whether his researches are suggested by the study of mathematical literature or the ideas come to him spontaneously, whether he publishes his ideas immediately or leaves them for a time, whether he observes regular rules in his living, whether he finds the morning or evening best for work, and so forth. The answers are to be analysed by Prof. Th. Flournoy and Dr. E. Claparède, both experienced psychologists.

THE system of "normal piling" which forms the basis of Prof. Osborne Reynolds's "Theory of the Universe," is discussed by the late Prof. J. D. Everett in the *Philosophical Magazine* for July. In the review of Prof. Reynolds's work, which appeared in *NATURE*, attention was directed to the fact that the arrangement of spheres consistent with minimum volume is not unique. Prof. Everett's paper states that every system of maximum compactness consists of parallel tiers in triangular arrangement, but each tier can be fitted over the one below in two ways. When two tiers have been placed the piling will be normal if the spheres of the third tier are *not* vertically above those of the first; but another arrangement, giving rise to what Prof. Everett called *antinormal* piling, may be obtained by placing the third tier in the spaces above the first.

AMONG recent contributions to aeronautics, considerable interest attaches to Mr. A. F. Zahm's paper on atmospheric friction, published in the *Bulletin* of the Philosophical Society of Washington, xiv., pp. 247-276. It is commonly assumed by experimenters that skin friction in ordinary gliding models is a negligible quantity, but Mr. Zahm finds that the frictional resistance is not improbably as great for air as for water in proportion to their densities, and, indeed, that it constitutes one of the chief obstacles to bodies and aërosurfaces gliding at high speeds. By plotting the relations between velocity and resistance on logarithmic squared paper, the author found for plane surfaces that the frictional resistance varied as the power of the velocity with index 1.85. Prof. M. Smoluchowski-Smolán, in his paper in the *Philosophical Magazine* for June on the principles of aerodynamics, discusses the equations of motion of a compressible fluid when account is taken of thermodynamical effects, and he applies the principle of dynamical similarity to certain physical problems. The *Scientific American* for September 10 contains two illustrations of gliding machines. The idea of attaching a machine to a bicycle in order to attain the requisite speed has doubtless frequently suggested itself to experimenters, and Mr. S. V. Winslow contributes a photograph of a "bicycle aéroplane," which he alleges "has proven perfectly successful so far as balancing is concerned." The figure of Prof. Botts's circular aéroplane, furnished with vertical screws in the centre, reminds one of the illustrations in the well known "Histoire des Ballons" of Tissandier, and it may be safe to predict that a small model of this pattern would constitute a pretty toy, and would sail well through a room.

In the *Journal* of the Royal Microscopical Society for August, a simple direct proof of Abbe's theorems on the microscopic resolution of gratings is given by the late Prof. J. D. Everett, F.R.S.

In the *Physical Review* for July Mr. N. A. Dubois describes a simple method of employing allotropic silver for the preparation of conducting fibres for quadrant electrometers and other similar apparatus. The author finds that dried films of allotropic silver, although poor conductors, become very good conductors on being treated with gaseous hydrochloric acid, and that the method can be applied to the most delicate apparatus in a few minutes without risk of injury.

MESSRS. E. L. NICHOLS and E. Merritt describe some interesting studies on fluorescence in the *Physical Review*, xix., 1 (July). The authors found that eosin, naphthalin roth, fluorescein, quinine sulphate, chlorophyll, canary glass, green and white flourspars, and other substances exhibited the same types of fluorescence, the spectrum consisting of a single band near the infra edge of the corresponding absorption band. The position of the maximum and the distribution of intensity was independent of the wave-length or composition of the exciting light. Fluorescence near the red or violet ends was traceable further towards the opposite end than is the case with bands near the middle of the spectrum, because of the increased luminosity in these directions. In no case did Stokes's law hold. Fluorescent substances having absorption bands of shorter wave-length than that with which fluorescence was associated were excited by light in that band, but the same was not the case when the wave-length was longer. Finally, where more than one fluorescence band existed, it was considered probable that each was due to a different fluorescent material, as no case of multiple fluorescence occurred where only one fluorescent substance was present.

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THE first two numbers (July and August) of a new magazine—*Le Radium, La Radioactivité et les Radiations*—received from MM. Masson and Co., Paris, contain many useful and interesting articles on radio-activity and allied subjects. These articles are not original contributions, but are readable and well illustrated accounts of very recent original work. Several deal with recent attempts to use radio-active bodies for therapeutic purposes. There are in addition reviews of recent papers, notices of new books, and a correspondence column. While such a magazine may not be essential to those who are able to keep in touch with the recognised scientific journals, it will probably be found useful by many interested in the subject.

THE meteorological observations and results relating to the Bremen Observatory for 1903 have been published by Dr. Paul Bergholz. The volume forms one of the series of the *Deutsches meteorologisches Jahrbuch*; it therefore follows that the work leaves nothing to be desired. The tables show the actual readings at three hours daily, with monthly and yearly means, and daily means for each hour. In addition, there are phenological and other observations for Bremen, and rainfall summaries for several stations in connection with the observatory.

WE have received the report on rainfall registration in Mysore for 1903, by Mr. J. Cook, director of meteorology in that province. The number of Government stations is 194. In addition to the tables, the report includes useful maps showing average monthly, yearly, and geographical rainfall for thirty-four years (1870-1903). During 1903 some heavy falls in twenty-four hours are recorded:—11 inches in the district of Shimoga, in July; 11.5 inches in Kolar, in November; 12.65 inches in Kadur, in July. Mr. Cook states that a station which escapes inspection even for a single year is most likely to be defective in some particular; a yearly inspection would obviously entail a large amount of expense in travelling, and its necessity would seem to point to want of interest by the observers in their work.

WE have received a copy of a second edition of Mr. Conway Belfield's "Handbook of the Federated Malay States," which has just been published. The book has been thoroughly revised, and the statistics brought down to the end of the year 1902.

PROF. J. CVIJIĆ contributes to the *Mitteilungen* of the Vienna Geographical Society an important paper summarising the results of recent research on the glacial phenomena of the Balkan peninsula, and correlating them with the results of similar investigation in the Alps and Carpathians.

WE have received the third *Bulletin* of the International Council for the Study of the Sea, containing the observations made during the cruises of the different vessels in February, 1904; also No. 14 of the council's *Publications de Circonstance*, on surface temperature observations in the North Sea, by Dr. Evan Everdingen and Dr. C. H. Wind.

A SERIES of gazetteers of the States is being published by the U.S. Geological Survey. During the last few weeks gazetteers of Virginia, Maryland, Delaware, and Texas have appeared, each giving a general description and an account of special features. Another valuable publication of the same department is a third edition of the *Bulletin* on the "Boundaries of the United States and of the Several States and Territories."

THE Central Meteorological Observatory of Japan has issued the first of a new series of *Bulletins*, in which it is

intended to publish the results of researches on meteorology and allied sciences made by members of the staff of the observatory. The present *Bulletin* contains valuable papers on earth temperature at Tokio, the mean annual temperature of the surface of the sea in the Western Pacific Ocean, the epochs of the first ice in Japan for 1902, and evaporation in Japan.

A VALUABLE contribution to the theory of oceanic currents is made by Prof. Otto Pettersson in a paper on the influence of ice-melting upon oceanic circulation, published in the September number of the *Geographical Journal*. Prof. Pettersson describes the results of some remarkable experimental work, and gives an account of recent theoretical inquiries by himself and others, applying the results to the elucidation of the complex circulation in the Norwegian Sea and the north polar basin. An interesting point is the suggestion that the problem of forecasting the monsoons of India may ultimately be solved by a systematic survey of the hydrographic conditions in the Indian Ocean.

THE analyses given in the Jamaica *Bulletin* of the Department of Agriculture (August) testify to the purity of the native sugars, but where the sugar is required for preserving fruit the addition of an antiseptic is found to be necessary in order to prevent infection with *Torula*. Experiments are being made with calcium bisulphite.

MORE than a dozen fungi have been recorded as destructive parasites on vine-roots, and to these an addition has been made by Dr. Istvánffi, who describes in the third volume of the *Annals* of the Royal Hungarian Viticultural Institute how he has traced the cause of disease in several districts in Hungary to the ravages of the Gasteromycete, *Ithyphallus impudicus*.

THE second part of "Plantæ Yucatanæ," forming vol. iiii. of the botanical series of the Field Columbian Museum, Chicago, was issued in April, and deals with the Compositæ. The features of this work, which include only plants of the northern half of Yucatan, are the descriptive accounts, with occasional notes on native names and uses, by Dr. Millspaugh and the excellent drawings of flower and fruit executed by Mrs. Chase for each species.

THE most striking features of the North American and Mexican deserts are discussed at some length in Schimper's "Plant Geography." In the *Botanical Gazette* (July) Dr. D. T. MacDougal gives an account of the expedition which he arranged to explore the delta of the Rio Colorado and that practically unknown portion of the Mexican desert which lies on both sides round the head of the Gulf of California. Amongst the xerophytes, which were found in the regions of extreme aridity, were many perennials containing latex and a large number of forms which secrete volatile oils or exude resinous gums; but plants with massive storage organs were absent, a fact which Dr. MacDougal attributes to the excessively small and even distribution of the rainfall throughout the year.

THE two articles in the September number of the *Zoologist* are devoted to ornithology, Mr. F. M. Littler treating of the birds of Tasmania, while Sergeant H. Mackay, of the 2nd Highland Light Infantry, discusses those of Jersey. It is highly satisfactory to find a non-commissioned officer of His Majesty's Service studying the zoology of the district in which he happens to be quartered.

THE report of the Indian Museum, Calcutta, for 1902-3, and that of the Albany Museum, Cape Colony, for 1903, are just to hand. Both institutions appear to be in a flourishing condition, although there are complaints from both of insufficient numbers on the staff to cope with the work.

The registered additions to the Indian Museum during the period covered by the report numbered 2096 specimens, of which 326 were archæological and the remainder zoological. It is satisfactory to note that the Albany Museum is making strenuous efforts to secure a representative series of the large mammals of the Cape Colony and adjacent districts, its present deficiency in the smaller forms being a matter of little consequence, as these are in no present danger of extermination.

THE prophylaxis of malaria was exhaustively discussed in the section of tropical diseases at the recent meeting of the British Medical Association (*Brit. Med. Journ.*, September 17, p. 629). Dr. Strachan, C.M.G., principal medical officer of Lagos, West Africa, emphasised the value of anti-mosquito measures and of the prophylactic use of quinine. Captain James and Lieut. Christophers, from their experience at Mian-Mir (see *NATURE*, lxi. p. 467, and lxx. p. 230), doubted the universal applicability of anti-mosquito measures for the reduction of malaria. Prof. Ronald Ross, F.R.S., criticised the work and conclusions of the last named observers on the following grounds:—(1) it is doubtful if mosquito propagation at Mian-Mir was really suppressed to the extent claimed; (2) the tests employed for detecting reduction in the number of mosquitoes were not conclusive; (3) the figures given regarding the variations in the amount of malaria are inconclusive; (4) the whole experiment is open to the final criticisms (a) that it might not have been continued long enough, and (b) that the radius of operations might not have been large enough. He considered that all that the experiments proved was that after operations (i.e. anti-mosquito measures) extending to a half-mile radius, lasting a year and a half, and apparently costing between two and three hundred pounds, no very large reduction in the number of mosquitoes or in the amount of malaria was apparent.

MESSRS. CHARLES GRIFFIN AND CO. have just published the sixth edition, revised and enlarged, of Mr. Andrew Jamieson's "Elementary Manual of Applied Mechanics."

MR. BALFOUR's presidential address delivered before the British Association at the recent meeting at Cambridge, and printed in *NATURE* of August 18, has been published in pamphlet form by Messrs. Longmans, Green and Co. The price of the pamphlet is one shilling net.

A CHEAP edition of Lord Avebury's book on the "Scenery of England" has been published by Messrs. Macmillan and Co., Ltd. The book contains nearly two hundred illustrations—many of them full-page and all instructive—and in its new form it should be the means of creating wide interest in the scientific significance of scenery.

THE first volume of *Technics*—a magazine for technical students—is full of useful articles and notes on many aspects of technology. There are descriptions of institutions where the work of higher scientific and technical education is being developed, articles on the education of engineers, educational systems, designs, materials and manufactures of various kinds, photography, bacteriology, and many other departments of pure and applied science. The magazine is well illustrated, and should be of real service to technical education in this country. The publishers are Messrs. George Newnes, Ltd.

MR. EDWARD ARNOLD announces an illustrated work on "English Estate Forestry," by A. C. Forbes.

THE list of announcements of the Cambridge University Press includes:—"Mathematical and Physical Papers by the late Prof. Sir G. G. Stokes, Bart., F.R.S.," vol. v.;

"The Collected Mathematical Papers of Prof. J. J. Sylvester, F.R.S.," vol. ii.; "The Dynamical Theory of Gases," by J. H. Jeans; "The Analytical Theory of Light," by J. Walker; "A Treatise on Analytical Dynamics," by E. T. Whittaker; "Alternating Current Theory," by A. Russell, in two vols.; "The Study of Chemical Composition," by I. Freund; "The Fauna and Geography of the Maldive and Laccadive Archipelagoes: being the Account of the Work carried on and of the Collections made by an Expedition during the years 1899 and 1900 under the leadership of J. S. Gardiner," vol. ii., part iv., illustrated; "Reports of the Anthropological Expedition to Torres Straits by the members of the Expedition," edited by Dr. A. C. Haddon, F.R.S.; "Studies from the Anthropological Laboratory in the University of Cambridge," by W. L. H. Duckworth, vol. i.; "On two Orders of Arachnida: Opiliones, especially the Suborder Cyphophthalmi and Ricinulei, namely the family Cryptosemmatoidæ," by Drs. H. J. Hansen and W. Sørensen, illustrated; "Immunity in Infectious Diseases," by Prof. Metchnikoff, authorised English translation by F. G. Binnie, illustrated; "Morphology and Anthropology," by W. L. H. Duckworth; "The Origin and Influence of the Thorough-bred Horse," by Prof. W. Ridgeway; "Fossil Plants: a Manual for Students of Botany and Geology," by A. C. Seward, F.R.S., vol. ii.; "Trees: a Handbook for Students of Forest Botany," by Prof. H. M. Ward, F.R.S., in six volumes, vols. ii. to vi.; "The Morphology of Plants," by J. C. Willis; and "The Journal of Agricultural Science," edited by Prof. T. H. Middleton, T. B. Wood, R. H. Biffen, and A. D. Hall.

Messrs. JOHN WILEY AND SONS (New York) and Messrs. Chapman and Hall, Ltd. (London), have in preparation:—"An Elementary Treatise on the Differential Calculus, Founded on the Method of Rates," by W. W. Johnson; "A Treatise on Concrete, Plain and Reinforced," by F. W. Taylor and S. E. Thompson; "Elements of General Drafting for Mechanical Engineers," by C. E. Coolidge and H. F. Freeman; "Conversations on Chemistry," by W. Ostwald, translated by E. C. Ramsay, part i.; "Machine Shop Tools and Methods," by W. S. Leonard; "Ordinary Foundations, including the Cofferdam Process for Piers, with numerous Practical Examples from Actual Works," by C. E. Fowler; "The Textile Fibres, their Physical, Microscopical, and Chemical Properties," by J. M. Matthews; "Manual of the Chemical Analysis of Rocks," by H. S. Washington; "Untechnical Addresses on Technical Subjects," by J. Douglas; "Techno-Chemical Analysis," by G. Lunge, translated by A. I. Cohn; "Application of some General Reactions to Investigations in Organic Chemistry," by Prof. Lassar-Cohn, translated by J. B. Tingle; "Notes on Assaying and Metallurgical Laboratory Experiments," by R. W. Lodge; "Elements of Mechanism," by P. Schwamb and A. L. Merrill; "An Introduction to Projective Geometry and its Applications, an Analytic and Synthetic Treatment," by A. Emch; and "Manual of Serum Diagnosis," by O. Rostoksi, translated by C. Bolduan.

OUR ASTRONOMICAL COLUMN.

THE SOUTH TEMPERATE SPOTS ON JUPITER.—In a letter to No. 348 of the *Observatory*, Mr. Denning directs attention to the need for further observations of the white spots which encroach on the south side of the south temperate belt of Jupiter.

On August 9 he saw two brilliant spots in this locality, having the longitudes $254^{\circ}.1$ and $290^{\circ}.1$ respectively, and has little doubt that these are identical with those he observed in 1903 and previously.

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As Mr. Denning has suggested that the movements of these objects may cause the observed irregularities in the velocity of the great red spot—the velocity of which is a little less—it is important that they should be frequently observed, and the results of the observations published.

The spots lose about $16^{\circ}.4$ per. month relatively to Crommelin's System II., and their positions for the next few months will be as follows:—

			I. Long.		II. Long.
1904	Oct. 15	...	$218^{\circ}.4$	...	$254^{\circ}.0$
	Nov. 15	...	$202^{\circ}.0$	...	$237^{\circ}.6$
	Dec. 15	...	$185^{\circ}.6$	...	$221^{\circ}.2$
1905	Jan. 15	...	$169^{\circ}.2$	...	$204^{\circ}.8$
	Feb. 15	...	$152^{\circ}.8$	...	$188^{\circ}.4$

Mr. Denning will be pleased to receive records of new or old observations of these objects.

A RAPIDLY MOVING SOLAR PROMINENCE.—A fairly large prominence having a great velocity was observed by Mr. J. B. Coit, of Boston University, on May 23. Whilst setting the slit of his spectroscope on Ha he noticed a cloud-like arch, made up of radial filaments, stretching from $P=89^{\circ}$ to $P=100^{\circ}$, the space below the arch being apparently quite blank. At 11h. 55m. the altitude of the prominence was $90''$, and it quickly increased to $105''$, after which it rapidly decreased until, at 11h. 58m., it was only $70''$. By this time all semblance to the original structure was lost, and only a few cloudlets remained. At 12h. 1m. nothing could be seen above the limb, and the chromosphere between 89° and 100° was quite tranquil, except for a few small shreds at the places where the ends of the arch had rested. Subsequent observations with a 5-inch equatorial showed no trace of spots or bright faculae on or near the limb in this region (*Popular Astronomy*, No. 7, vol. xii.).

PUBLICATIONS OF THE GRONINGEN ASTRONOMICAL LABORATORY.—Two numbers of these *Publications*, which are printed in English and edited by Prof. Kapteyn, have just been received. No. 12 is devoted to the results of an investigation by Dr. W. de Sitter of the systematic differences between the photographic and visual magnitudes of stars depending upon the galactic latitude. The investigation was carried out at the Cape Observatory, Dr. de Sitter taking the photographs and Mr. R. T. A. Innes making the visual observations.

The results show, among other things, that the colours of the stars near the galactic poles seem to be distributed at random, and, further, that no *average* colour exists for those in the galaxy, but rather that there are colour differences which vary irregularly with the galactic *longitude*. This interesting result calls for further investigation, and Dr. de Sitter suggests several methods which might be employed to elucidate the matter further.

No. 13 of the *Publications* contains a catalogue of the proper motions of 66 stars of the Hyades, derived from the comparison of thirty-four catalogues published between 1755 and 1900. This work was performed by Herr H. A. Weersma to facilitate the reduction of Prof. Duner's plates, which were taken for the purpose of determining the proper motions of the Hyades stars. The results are given in detail in the paper, which concludes with a general catalogue of the 66 stars, showing their magnitudes, their positions for 1900, and their proper motions.

THE GOODSSELL OBSERVATORY EXPEDITION TO THE ROCKY MOUNTAINS.—A short general description of the results obtained by Dr. H. C. Wilson and Prof. Payne during their sojourn at Midvale (Mont.), which is situated at an altitude of about 4800 feet in the Rocky Mountains, is given in No. 7, vol. xii., of *Popular Astronomy*.

The expedition was undertaken in order to photograph some of Herschel's suspected nebulous regions under exceptionally good atmospheric conditions. The heavy dews, caused by a difference of 40 or 50 degrees between the day and night temperatures, and the smoke from neighbouring forest fires somewhat interfered with the carrying out of the entire programme, but on the whole the photographs obtained were very successful. A full description of the work accomplished, the observing conditions, &c., is promised for a later publication.